

Remarks

Claims 1-42 are pending.

Continued appreciation is expressed for the indication of allowance of claims of 33-42 and allowability of claim 30. However, at this time the applicant continues to defer amendment of claim 30 he has had the opportunity to traverse the Examiner's rejections.

Rejection of Claims under 35 U.S.C. § 102

Claims 1-3 and 11 stand rejected under 35 U.S.C. §102(b) as being anticipated by A.A. Al-Jumah and T. Arslan, *Artificial Neural Network Based Multiple Fault Diagnosis in Digital Circuits*, IEEE, 1998 (Al-Jumah). The applicant respectfully traverses this rejection.

Al-Jumah does not teach or suggest a method including:

training checking circuitry to selectively classify future input vectors to the digital hardware block as either good or not good, using the set of known bad input vectors,

as required by independent claim 1. Regarding this step, the Examiner refers to page II-304, column 2, last three sentences, which state:

One of the above data sets is selected to train and test the ANN diagnostic system. The training data is generated by inserting one fault in the circuit followed by the construction of the corresponding FTT. The testing data is compiled by randomly inserting two faults in the circuit. The ANN diagnostic system is trained with single-fault data and tested with multiple-fault data.

Thus, the Examiner suggests that Al-Jumah's technique for training an Artificial Neural Network (ANN) to perform fault diagnosis of a circuit under test reads on the foregoing limitation of claim 1. The applicant respectfully disagrees.

Neither the cited portion of Al-Jumah, nor any other portion of Al-Jumah teaches or suggests training anything, let alone checking circuitry, to selectively *classify future input vectors* to the digital hardware block *as either good or not good*. While Al-Jumah does teach using single-fault and/or multiple-fault data to train the ANN, noting in the cited portion of Al-Jumah, or any other portion of Al-Jumah, suggests that the purpose of

training is to selectively classify future input vectors to a digital hardware block as either good or not good.

In response to similar arguments presented by the applicant in his Response of February 25, 2005, the Examiner states:

Al-Jumah at page 304, section 2, line 5, states that the Artificial Neural Networks (ANNs) are trained using test vectors. The ANN is a software representation of a hardware device and represents the checking circuitry. The test vectors are classified as either good or not good for the circuit being tested. (Office Action of July 14, 2005, p. 11, no. 1)

Whether or not the Examiner's characterization of Al-Jumah is correct (and the applicant does not concede this point), nothing in this statement demonstrates that Al-Jumah teaches training checking circuitry to selectively classify future input vectors to the digital hardware block as either good or not good, using the set of known bad input vectors. Whether or not Al-Jumah teaches that "test vectors are classified as either good or not good for the circuit being tested," Al-Jumah's training is so that the ANNs provide acceptable circuit fault diagnosis. Al-Jumah simply fails to not teach training checking circuitry for the purpose of input vector classification.

Accordingly, the applicant respectfully submits that independent claim 1 is allowable over Al-Jumah. Claims 2-12 depend from claim 1 and are allowable for at least this reason.

Rejection of Claims under 35 U.S.C. §103: Al-Jumah in view of Kung

Claims 4-9, 12, 20-27, 29, 31 and 32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Al-Jumah in view of S.Y. Kung, *Digital Neural Networks*, Chapter 2, pages 43-72, Prentice Hall, January 1988 (Kung). The applicant respectfully traverses this rejection.

Regarding claims 4-9 and 12, the applicant respectfully submits that these claims are allowable for at least the reasons stated above regarding independent claim 1.

Additionally, Al-Jumah and Kung, taken alone or in combination neither teach nor suggest a circuit including:

a memory array containing a weight matrix having elements which are based on a set of known bad input vectors for the digital hardware block;
and

means for selectively classifying future input vectors to the digital hardware block as either good or not good, using the weight matrix,

as required by independent claim 20.

As set forth above, Al-Jumah does not teach or suggest a means *for selectively classifying future input vectors* to the digital hardware block *as either good or not good*. Moreover, Al-Jumah makes no such teaching with respect to using the claimed weight matrix. Regarding the claimed weight matrix having elements which are based on a set of known bad input vectors, the Examiner states:

Kung teaches a weight matrix W having elements, which are input vectors (pages 45-46). Therefore, it would be obvious . . . to combine Al-Jumah in view of Kung for the purpose of having ideal pattern retrieval. (Office Action of July 14, 2005, p. 12, no. 2)

The applicant respectfully disagrees.

Pages 45 and 46 of Kung describe certain mathematical features of the synaptic weight matrix W. As described in Kung, the synaptic weight matrix W is based on the correlation of input and output pattern pairs for a generalized linear associative memory. Nothing in the cited portion of Kung teaches or suggests that W have “elements which are based on a set of known bad input vectors for the digital hardware block,” as required by independent claim 20.

The applicant respectfully submits that the Examiner has failed to establish a *prima facie* case of obviousness. In addition to the claim elements not taught or suggested by the cited references as described above, the Examiner has not shown that there is some suggestion or motivation to combine Al-Jumah and Kung, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. Neither reference suggests such a combination, and the Examiner merely refers to “the purpose of having ideal pattern retrieval.” The applicant believes this is a reference to Kung (page 45) where Kung illustrates when a noise free input vector is used, the original pattern is retrieved. This reference provides no motivation for the purported combination, and the applicant respectfully submits that the Examiner has

failed to explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination, as required by, for example, *In re Rouffet*, 47 USPQ2d 1453 (Fed. Cir. 1998).

Accordingly, the applicant respectfully submits that independent claim 20 is allowable over Al-Jumah and Kung, taken alone or in combination. Claims 21-32 depend from claim 20 and are allowable for at least this reason.

Rejection of Claims under 35 U.S.C. §103: Al-Jumah in view of Ton

Claims 10 and 13-15 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Al-Jumah in view of Ton, U.S. Patent No. 6,771,623 (Ton). The applicant respectfully traverses this rejection.

Regarding claim 10, the applicant respectfully submits that this claim is allowable for at least the reasons stated above regarding independent claim 1.

Additionally, Al-Jumah and Ton, taken alone or in combination neither teach nor suggest a method including:

providing a software work-around for the faulty hardware block; and
training checking circuitry to selectively classify future input vectors to the faulty hardware block as either good or not good, using a set of known bad input vectors,

as required by independent claim 13.

As set forth above regarding independent claim 1, Al-Jumah does not teach or suggest “training checking circuitry to selectively classify future input vectors to the faulty hardware block as either good or not good, using a set of known bad input vectors.”

Regarding the claimed “providing a software work-around for the faulty hardware block,” the Examiner merely states “Ton teaches the use of software work-around that provides redundancy.” Office Action of July 14, 2005, p. 9, ¶4. The applicant respectfully submits that the particular parts of Ton that the Examiner has relied upon have not been designated as nearly as practicable, and the pertinence of the reference has not been clearly explained, both as required by 37 C.F.R. § 1.104(c)(2). *See also* MPEP

§ 706.02(j). The Examiner has made no specific reference to any portion of Ton in support of the argument. At best, the Examiner has stated "Ton teaches the use of a software workaround for software maintenance." Office Action of July 14, 2005, p. 13, middle. Even assuming the combination of Al-Jumah and Ton is proper, and the applicant does not concede this point, use of a software workaround for software maintenance does not teach or suggest a software work-around for the faulty hardware block.

Accordingly, the applicant respectfully submits that independent claim 13 is allowable over Al-Jumah and Ton, taken alone or in combination. Claims 14-19 depend from claim 13 and are allowable for at least this reason.

Rejection of Claims under 35 U.S.C. §103: Al-Jumah in view of Ton and Kung

Claims 16-19 and 28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Al-Jumah, as applied to Claims 1-3 and 11 above, in view of Ton as applied to claims 10, 13-15, and further in view of Kung. Applicant submits that claims 16-19, which depend on claim 13, are allowable for at least the reasons mentioned in the previous discussion of claim 13. Applicant submits that claim 28, which depends on claim 20, is allowable for at least the reasons mentioned in the previous discussion of claim 20.

In view of the remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the examiner is requested to telephone the undersigned.

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA, 22313-1450, on 7/29/05, 2005.


Attorney for Applicant(s)

7/29/05
Date of Signature

Respectfully submitted,



Marc R. Ascolese
Attorney for Applicant(s)
Reg. No. 42,268
512-439-5085
512-439-5099 (fax)